

ENGINEERING OUTLOOK

AT THE UNIVERSITY OF ILLINOIS

RESEARCH

EDUCATION

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CHICAGO

DIAMOND JUBILEE EXHIBITION

Fundamental research and education in engineering will be the backbone of tomorrow's technology. This theme will dominate the University of Illinois display in the 75th Anniversary Exhibit of the Illinois Society of Professional Engineers, May 4 through May 8, at the State Armory in Springfield.

The display, designed to keep the people of the State informed of the work in engineering being done at the University, will represent the three major areas of engineering endeavor: the processing of information, the processing of materials, and the processing of energy. For example, the Department of Electrical Engineering will exhibit a small device in the information processing area which will demonstrate principles of biological computers. These computers distinguish themselves from high-speed digital computers by their ability to interact with the operator as a living, intelligent organism would.

Among the materials processing exhibits will be one from the Mining and Metallurgical Engineering Department of gold-cadmium alloy, an unusual material that exhibits a rubber-like behavior. An identical display was previously shown by invitation at the World's Fair in Brussels. The Ceramic Engineering Department will display high temperature materials and dielectric components of miniaturization systems such as those used in rocketry. Mechanical Engineering will enter a display which will indicate how experimental work is being conducted to measure the temperature distribution involved in the machining of metals.

The energy processing displays will include an exhibit which will show the appearance and functions of the University's new 100-kilowatt training and research reactor. Some of the other exhibits in this area will be a 140-220 mc/s microwave system from the Electrical Engineering Department and an explanation of the Aeronautical Engineering Department's work on the plasma jet, a thermal device used to study certain space propulsion problems.

The University display will be manned at all times by

personnel who will be able to answer visitors' questions about the displays, the Engineering College, and the study of engineering at the University.

USES FOR THE "USELESS"

Better roads at less cost would please highway officials and taxpayers alike, and toward this end the U. of I. Civil Engineering Department is hard at work. Research now in progress under the direction of Professor George W. Hollon is studying the performance of various road building materials, with present concentration on low quality and waste materials that are now considered useless.

For the past four years, Professor Hollon has been experimenting with slag and fly-ash material that is produced as a by-product by power plants. Illinois power plants alone annually produce 1,500,000 tons of this material, which is now not only useless but an expense to the company because it has to be hauled away and dumped. Low quality pit-run gravel, which is now considered waste material, is also being studied as an aggregate.

This research is now being given an important boost by the acquisition of a test facility for evaluating the performance of these materials in actual service. The machine, designed to "travel" thousands of miles and yet go nowhere, is soon to be erected by the Civil Engineering Department.

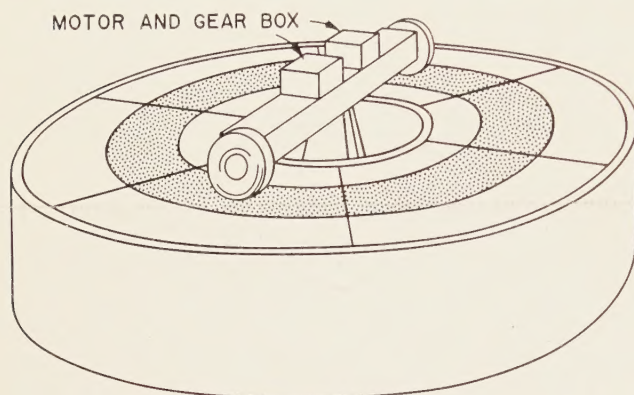
This piece of equipment will be a round test track 26 feet in diameter and divided into six segments, one consisting of the Illinois State Highway Department's standard crushed stone base construction, and the others of experimental construction. It will give each test section the equivalent of a year's wear each week.

Two truck wheels at ends of a beam pivoted in the middle of the track will spin along, moving in and out over a 2½ foot path, carrying loads varying from 1,700 to 3,000 pounds per wheel.

Four industrial sources have pledged funds to support the work. They are National Lime Association, Wash-

ington, D.C.; Pozzolan Products Co. and Marblehead Lime Co., both of Chicago; and Poz-O-Pac Company of America, Philadelphia.

The first three years of work with the new test track will be devoted to these "useless" aggregate fly-ash materials in combination with lime. These final experiments will test Professor Hollon's belief that such materials will make excellent, durable, and low-cost roadways. The final two years of research are scheduled for tests on the stabilization of natural soils by the use of lime.



CIRCULAR TEST TRACK

It is interesting to note that such materials are almost identical to those used by the ancient Romans in their roads, many of which are still in use after all these centuries.

MORE MILEAGE FROM ENGINEERING MANPOWER

A partial solution to the shortage of engineers lies in the training of more engineering technicians. The technician serves as an excellent assistant to the engineer in such activities as preparing drawings, conducting tests, gathering and summarizing information, and making cost estimates and time studies. By doing these things, the technician relieves the engineer of routine duties and leaves him more time to make use of his training and experience at the highest professional level. The number of technicians now in this country totals approximately one for every engineer. Informed estimates are that a ratio of three technicians to every engineer would be optimum for the most efficient use of engineering manpower.

Training for the engineering technician usually consists of from one to three years of study after high school, with two years being most common. This "technical institute" training is a practical education in the methods and techniques of engineering without as much emphasis on the theoretical background, the "why" that is so important to the engineer. Technical institute training is usually specialized in such fields as electronics, drafting, machine design, and so on.

In response to the growing interest in technical institute education, a committee was recently appointed by the College of Engineering at the request of the Office of the Superintendent of Public Instruction of the State of Illinois, to advise that office about the establishment of curricula for proposed technical institutes in Illinois. This committee will provide counsel to the State concerning the alignment of curricula and course content with the accreditation standards of the Engineers' Council for Professional Development, the national accreditation organization for engineering at both the collegiate and technical institute levels.

The University of Illinois committee is made up of representatives from various engineering departments. Its chairman is Professor J. S. Dobrovolny, Head of the Department of General Engineering.

TITANIA RECRYSTALLIZING PORCELAIN ENAMELS BULLETIN

If the finish on your new stove lasts longer and looks better, the reason may well be the use of titania enamels. These highly durable and acid resistant coatings have been developed for commercial use in recent years and are coming into wide use on appliances and other products in the home and in industry.

Many years of research, study, and data accumulation on these porcelain enamels have been put into Experiment Station Bulletin 456, "Titania Opacified Porcelain Enamels." This is the first time that such a large mass of data on this subject has been put into such a convenient form. The bulletin deals with crystallization, composition of enamel glass, properties of titania enamels, processing, and special applications of titania enamels. There is also a bibliography of 148 titles which should interest the ceramic engineer working in this area of research.

This Bulletin contains 49 pages, 32 figures, and 11 tables. It is available from the Engineering Publications Office at the price of one dollar.

HUNTING FOR OIL WITH ILLIAC

When a cook wants to make rabbit stew, he first has to catch a rabbit; when a petroleum engineer wants to develop an oil well, he must first find the oil. Just as rabbit hunting is both an art and a science, so is hunting for petroleum. Professor V. S. Tuman, U. of I. petroleum engineer, is doing fundamental research which promises to make petroleum prospecting more of a science, establishing a background of usable knowledge in the field and making a valuable tool for the use of oil companies.

Professor Tuman points out that whenever an oil well is drilled it is a common practice to prepare a set of well logs which indicate some of the physical properties

of the sands encountered. These logs, intricate wiggly lines on long strips of paper, make possible the computation of the porosity and saturation of fluids in the various strata. From the calculations of these logs, as well as from other available information, the petroleum engineer can decide whether any of the strata deserve further consideration. If the evaluation of a particular stratum in a developed area is favorable, then the well log data on the same stratum from surrounding wells, sometimes twenty to thirty of them, are also analyzed. Of course such a cross-analysis is impossible in the case of a wildcat well, where the prediction has to be based just on the data from the single well.

Normally, only a few strata in any given well are evaluated. The amount of time and effort involved in such an analysis usually prohibits the evaluation of all the sands encountered. Ideally, however, petroleum engineers would have evaluations of all strata of all previously drilled wells from which to make their predictions. Professor Tuman has devised a system to use ILLIAC, the University's high speed digital computer, to make this possible.

Professor Tuman is now working on an electronic device that will translate data automatically from oil well logs to tapes which can be used in the ILLIAC. ILLIAC will be able to complete computations on all the sands found in a well, a job which ordinarily cannot be done at all, in a matter of minutes. This will allow the petroleum engineer, who still must make the final decision, to make far quicker and more accurate predictions than ever before. These computations will be usable for any well in any area, once the technique is perfected.

Eventually a large number of water or oil-bearing strata will be evaluated and catalogued, making a tremendous mass of background knowledge available to the petroleum engineer. Obviously the number of water-bearing strata in this study will outnumber the oil-bearing strata by a large factor, but this will also be extremely useful knowledge. As the system develops, each new well will mean, rather than just a new problem to be solved, a

new addition to the background of information being accumulated.

Professor Tuman estimates that he will be making calculations for wells of the Illinois oil basin within two years. He hopes not only to be able to indicate immediate possibilities for new production, but also to discover fundamental information about underground oil strata and underground movements of water.

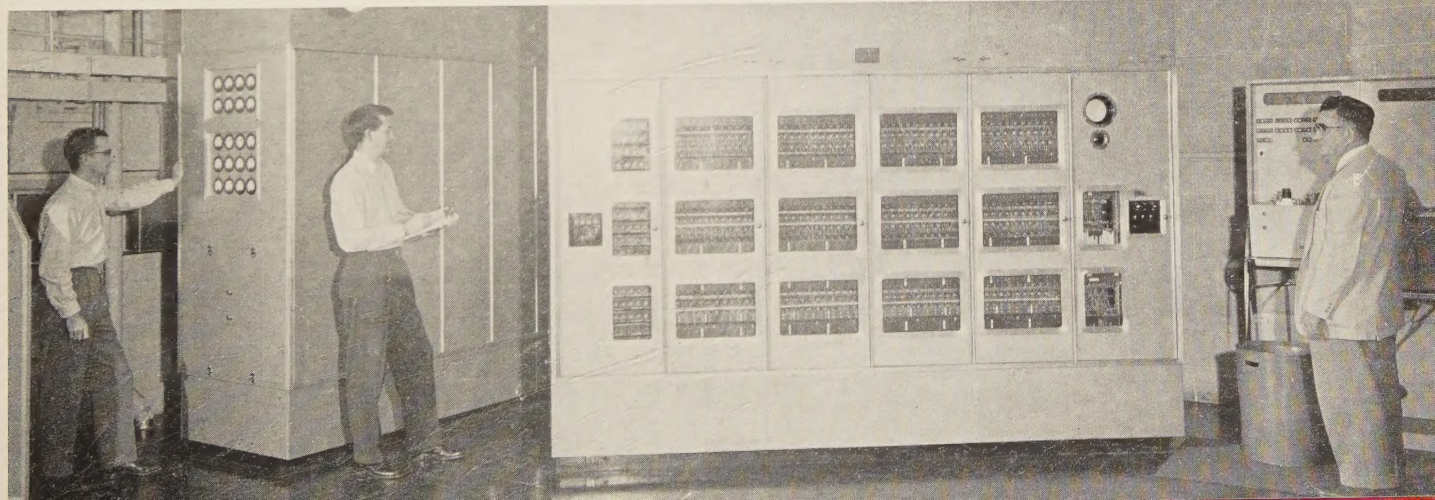
FOR CLOSER TIES WITH INDUSTRY

Mechanical engineering students and faculty will have the latch string out for people in industry at the annual Industrial Night, April 27, on the Urbana campus. Sponsored by the student chapter of the American Foundrymen's Society, Industrial Night is part of a yearly program designed to promote closer ties between industry and mechanical engineering on the University campus.

Each year the Central Illinois Chapter of AFS, with the support of industry, invites mechanical engineering students at the University to a meeting in Peoria. This meeting includes talks by engineers and engineering educators and a visit to industries in the Peoria area. Each spring, the University's mechanical engineering students and staff return the compliment by inviting people from industry to the Industrial Night, which includes a dinner at the Illini Union, the awarding of industrial scholarships and fellowships in mechanical engineering, and a talk by a prominent engineer from industry. Informal tours of the campus are also a part of the program for those who are interested. This year four Foundry Educational Foundation Scholarships for undergraduates and the Wheelabrator Graduate Fellowship will be awarded.

The speaker for the 1960 Industrial Night will be Kenneth A. Stonex, Assistant Director of the General Motors Proving Grounds at Milford, Michigan. Mr. Stonex will speak at 7:30 p.m. in Room 100 Physics Building about the work at the Proving Grounds on automobile safety.

ILLIAC, the high speed digital computer designed and built at the University, has added petroleum prospecting to the many engineering research areas in which it is a valuable tool.



The talk and all other activities of the Industrial Night are open to the public and everyone in industry is welcome and is being encouraged to attend. Further information concerning Industrial Night can be obtained from Professor James L. Leach of the Department of Mechanical Engineering.

INFORMATION ABOUT THE DEPARTMENTS

People who are coming to the University to work or study have many questions about curricula, prerequisites, scholarships, and other aspects of campus life. Every department in the College of Engineering has brochures which attempt to answer these questions and to tell where further information can be obtained. Two new brochures, one listing the curriculum in Ceramic Engineering and the other describing the new graduate program in Nuclear Engineering, have recently been issued.

The Ceramic Engineering folder tells about the four-year undergraduate program leading to a B.S. degree, and the graduate program leading to M.S. and Ph.D. degrees. It gives a full schedule of the courses required in the undergraduate program.

The Nuclear Engineering brochure describes the new program leading to an M.S. degree in Nuclear Engineering. It also tells how a Ph.D. candidate in one of the other departments of engineering can elect nuclear engineering as a minor in his program. It discusses admissions, facilities (including the new 100-kilowatt training and research reactor), University fellowships, and other items of interest.

These and other brochures about the engineering departments at the University of Illinois are distributed by the Engineering Publications Office.

A SEMINAR FOR INDUSTRY

A two-day seminar on aids in design room management will be held for people in industry by the General Engineering Department on April 28-29. Topics will be discussed not only by University people, but by men from such companies as Magnavox, Procter and Gamble, General Electric, Convair, Kearney and Trecker, Delco-Remy, and Bell Telephone.

Some of the topics relating to design room techniques and management will be the improvement of managerial effectiveness, the use of models as an aid to design, microfilming, the use of machines in engineering drawing, the automation approach, and several other topics on drafting practices.

Although this annual General Engineering Seminar will be attended by industry personnel from all over the country, no shortage of room is anticipated and no final application date has been set. Expenses will consist of the regular \$20.00 tuition fee and room and board. Anyone who would like more information on the program may write to Professor J. S. Dobrovolsky, 117 Transportation Building, University of Illinois, Urbana, Illinois.

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